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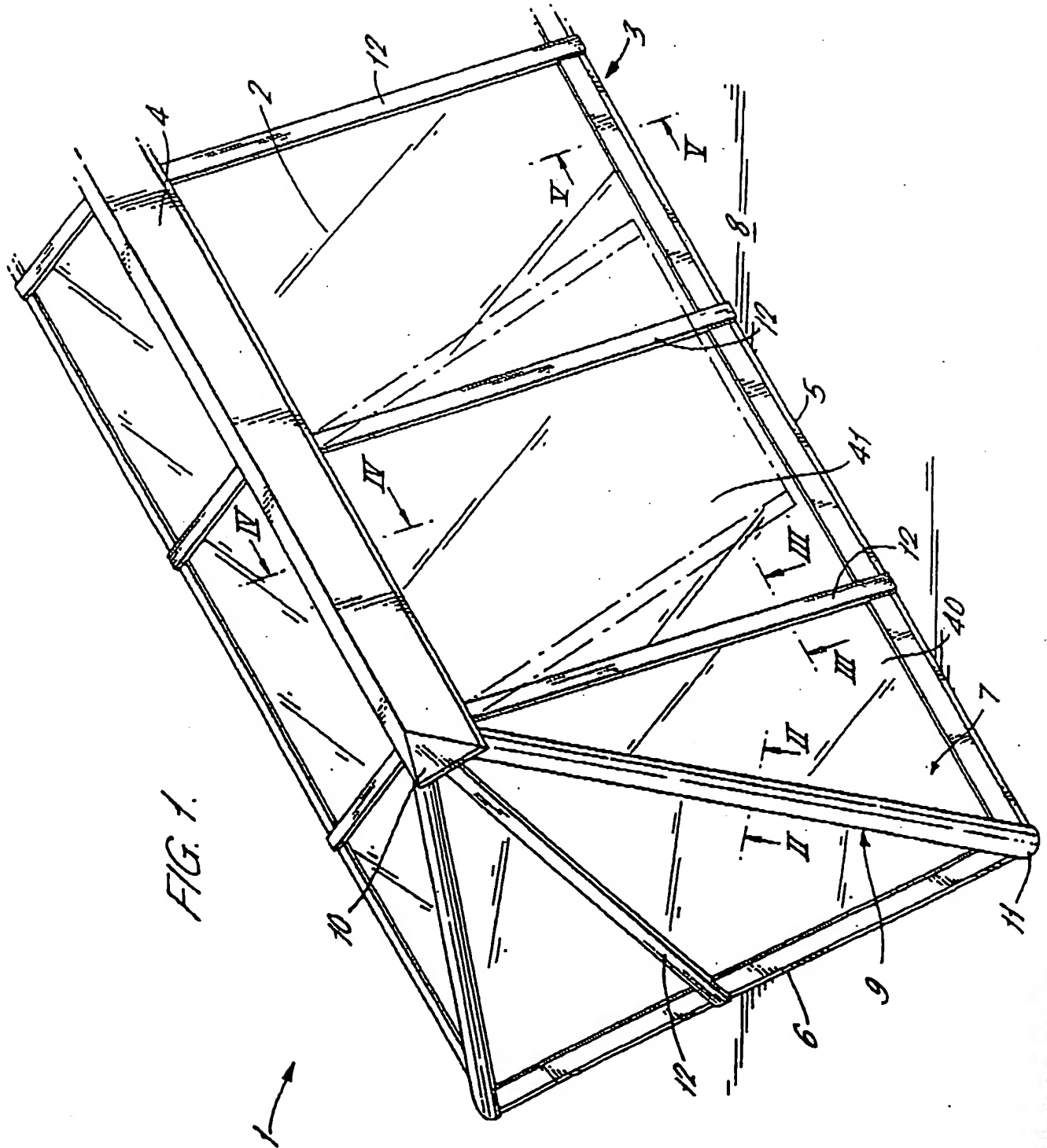
(56) Documents cited
GB2165878 A
GB2155981 A
GB2058896 A
GB2015630 A
GB1302604 A
GB1195583 A
GB0766358 A
GB0694640 A
GB0511984 A
GB0500623 A
EP0092078 A
EP0078910 A

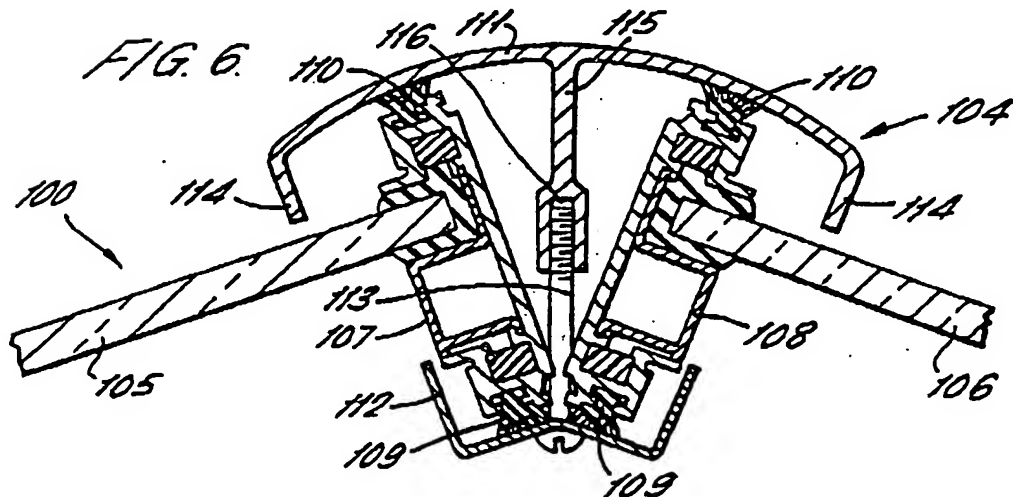
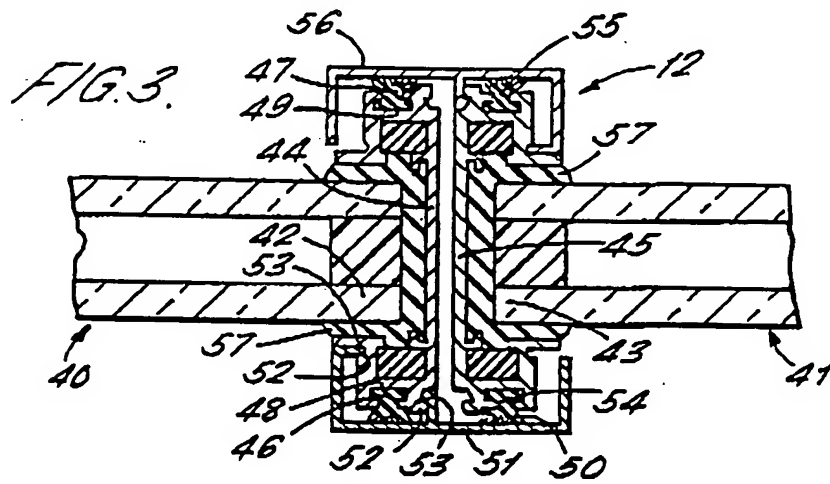
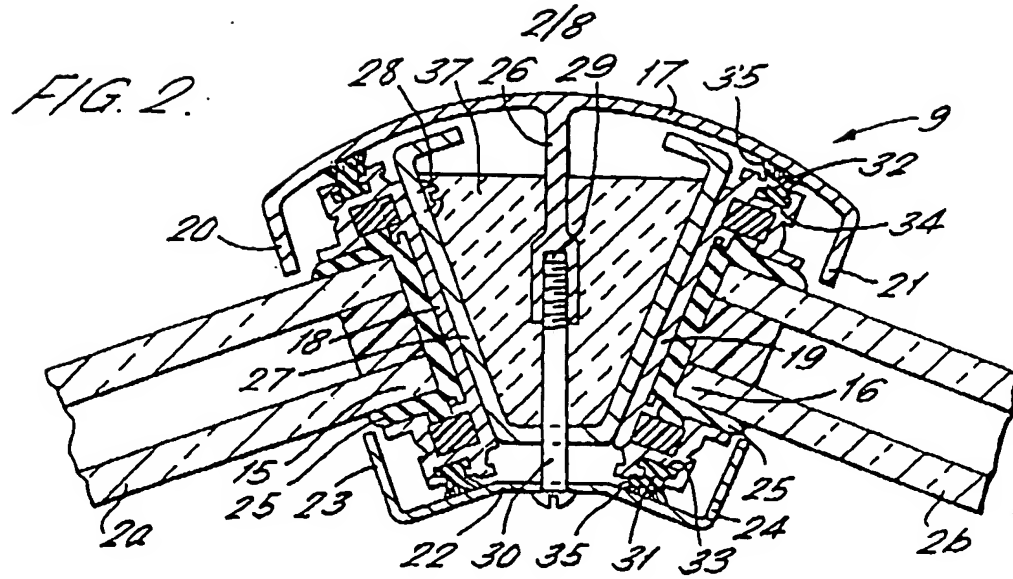
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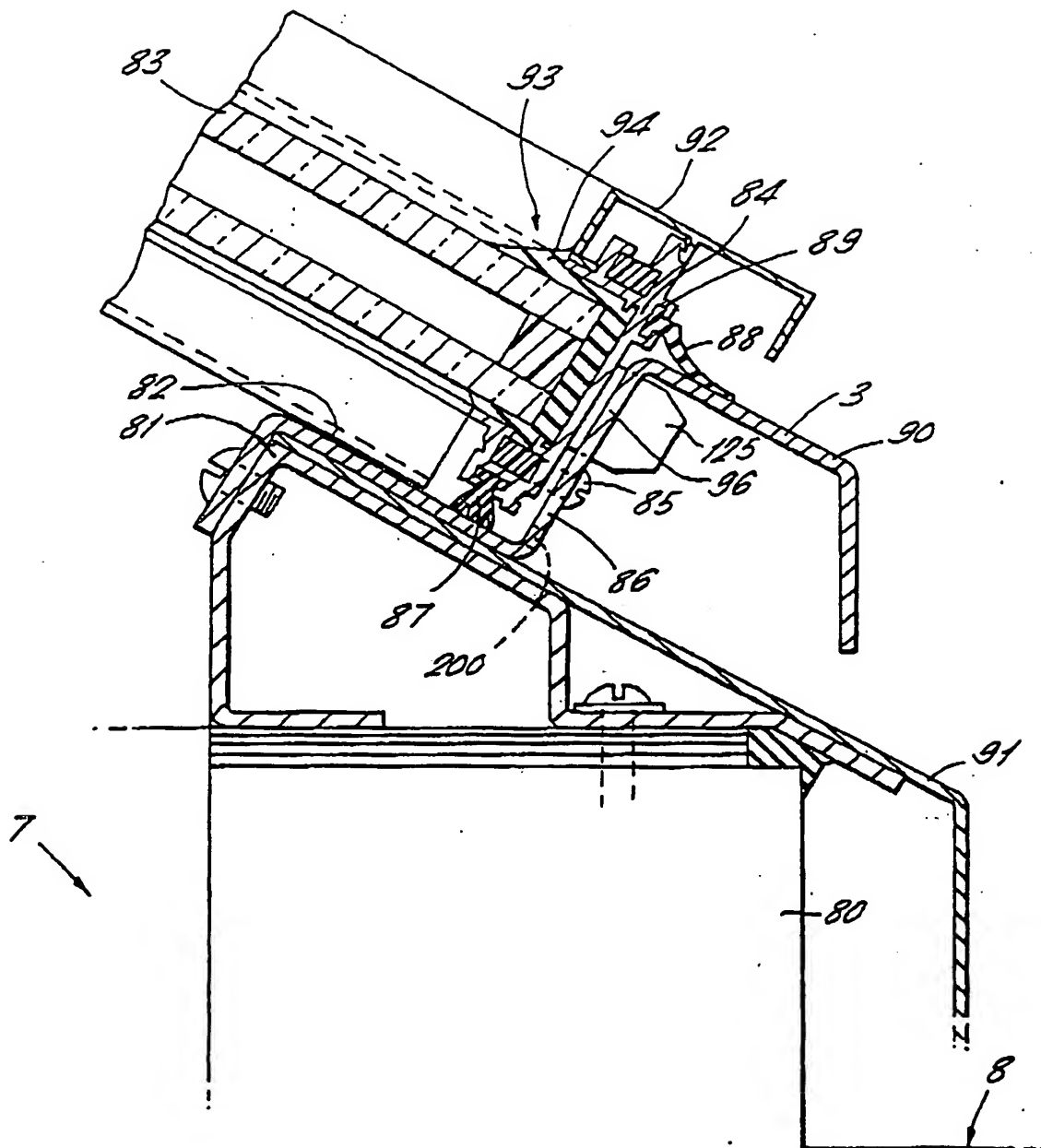
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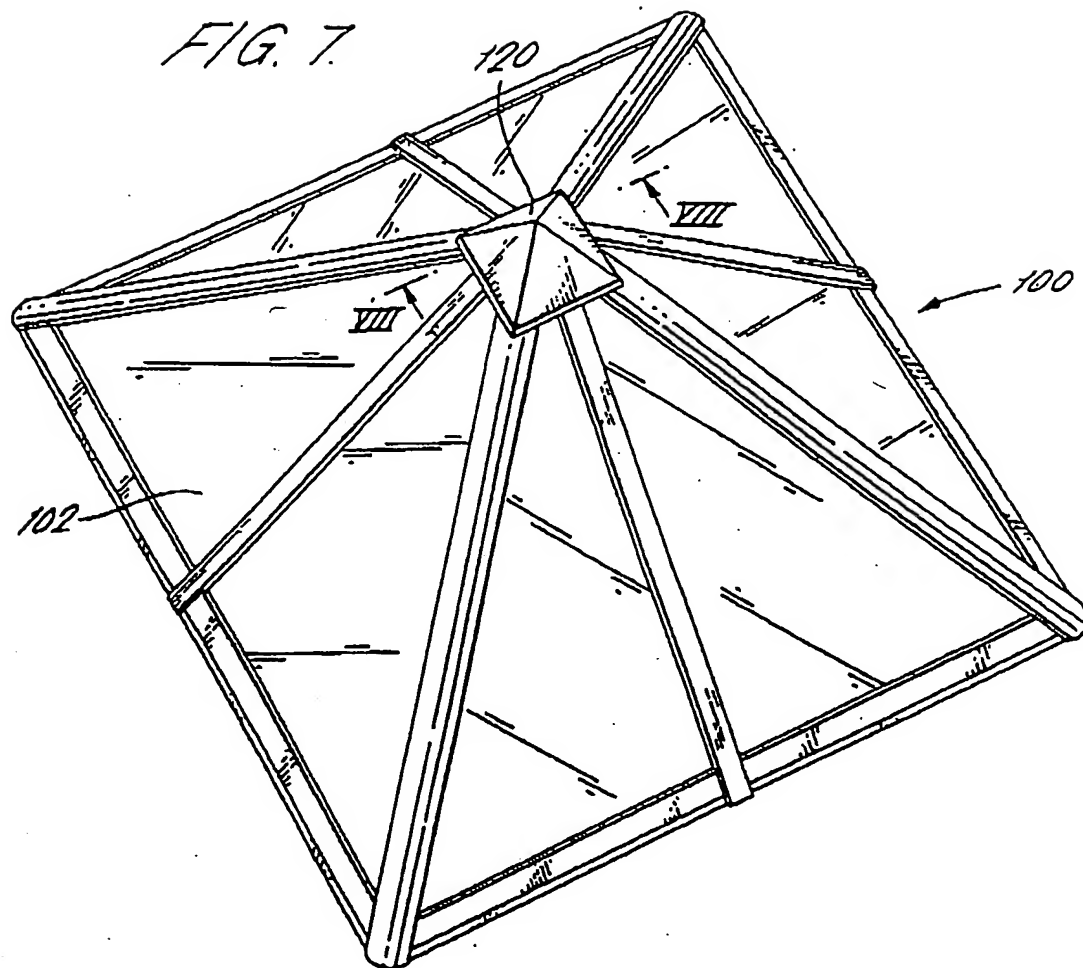


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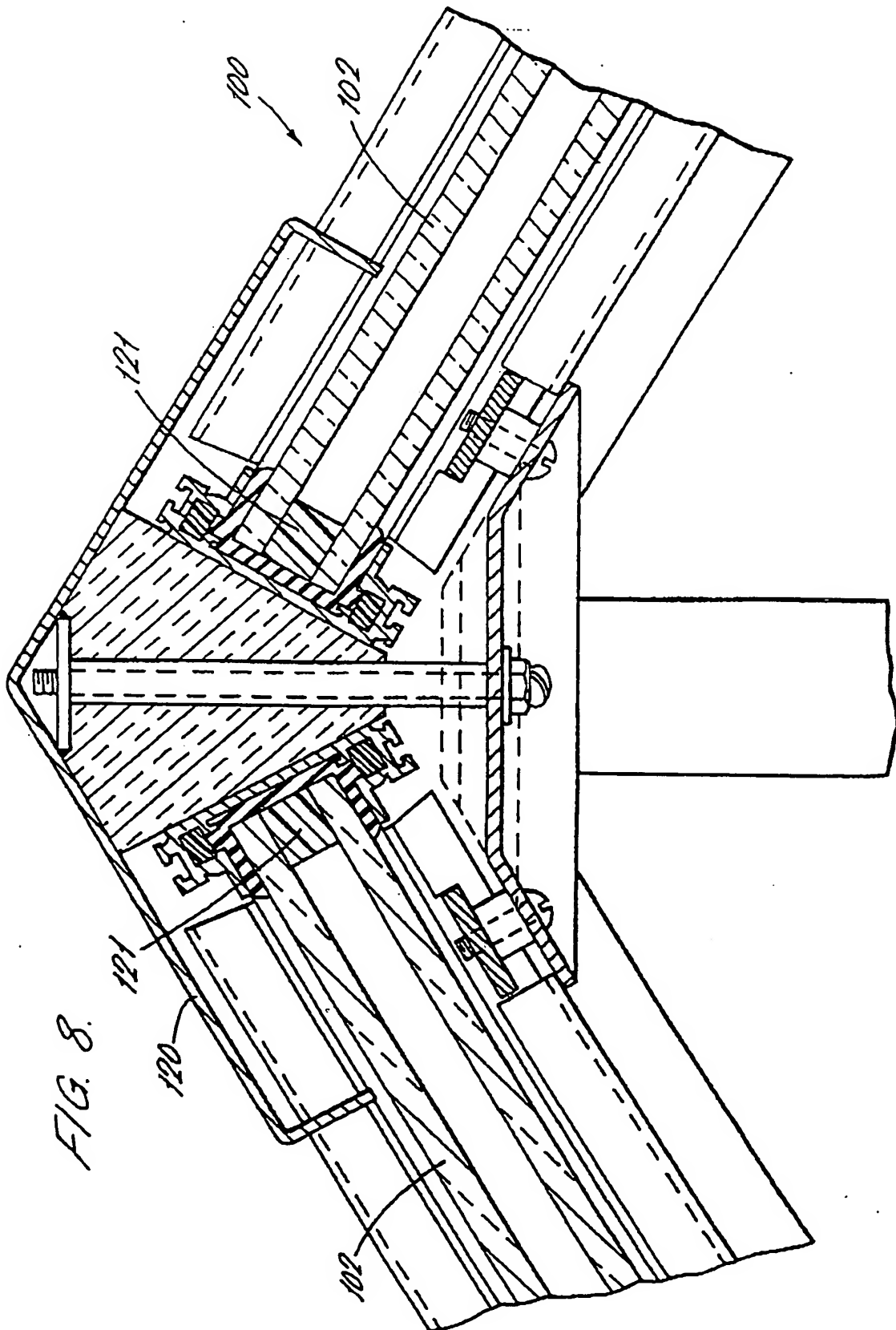
FIG. 5.



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FIG. 10.

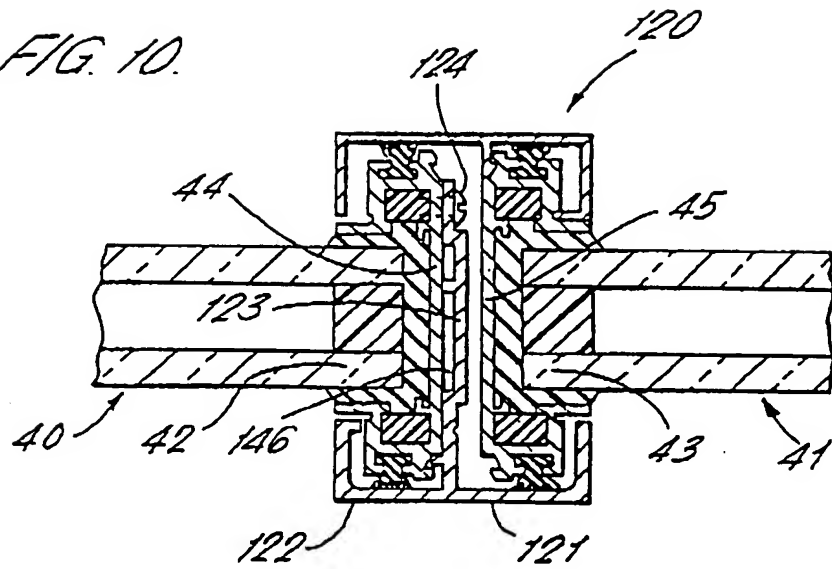
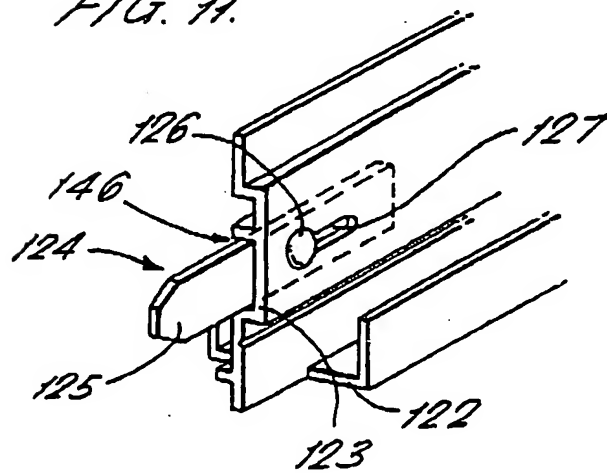


FIG. 11.



IMPROVEMENTS IN OR RELATING TO ROOFLIGHTS

This invention relates to rooflights of the type comprising a number of glazed windows and in particular but not exclusively to a rooflight in which
5 windows are connected to form a pyramid like structure having a triangular, rectangular or polygonal base and rising to a point or ridge.

Rooflights are known in which glazed windows are
10 assembled on site by connecting a base frame to the periphery of an aperture of a building and connecting the windows to the base frame and to one another to form a self supporting or reinforced pyramid like structure.

15 It is an object of the present invention to provide an improved rooflight assembly which is both straight forward to assemble and is satisfactorily weather proof against the ingress of wind and rain.

According to the present invention there is
20 disclosed a rooflight comprising a plurality of windows, each window comprising a glazed panel bounded by edge portions and each edge portion being received in and sealed to a respective frame member, wherein parallel adjacent first and second frame members of
25 adjoining first and second co-planar windows respectively are overlaid by a capping member comprising an extrusion profiled so as to overlay both the first and second frame member, and including a snap engaging formation which is snap engageable with
30 the first frame member, each frame member having seal means normally extending into sealing contact with the capping member, the arrangement being such that the capping member is attached only to the first frame member so as not to impede relative movement of the
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windows when at least one window is required to be openable.

5 An advantage of such an arrangement is that the windows may be supplied complete with frame members and seal means so that on-site assembly is simplified whilst providing good weatherproofing.

Preferably the seal means comprises at least one brush seal.

10 Advantageously the rooflight includes at least one hinged window, a pinless hinge being provided by integrally formed hinge formations of a connecting means and of a co-operating frame member of the hinged window, and there is provided a capping member engaged by a brush seal of the frame member in at least the
15 closed position of the hinged window. The use of pinless hinges facilitates rapid on site assembly since for example a skeletal frame may be erected including connecting means having integrally formed hinge formations and the hinged windows may then be
20 hung in place by engaging the co-operating formations.

Preferably the connecting means operable between two relatively inclined panels comprises an arcuate outer cap overlaying both adjacent frame members externally of the rooflight and an inner cap
25 overlaying the frame members internally with respect to the rooflight and each frame member includes inner and outer brush seals sealably engaging the inner and outer caps respectively.

30 Conveniently the inner and outer caps are connected by screw fitting means, the frame members being held thereby in compression between the opposing inner and outer caps such that the frame members are gripped in an adjustable relative position so as to
35 accommodate a range of pitch angles between adjacent panels.

The frame members may have an extruded profile

including a U shaped channel for receiving an edge portion of a panel, a pair of opposed ribs extending at right angles to and on opposite sides of the panel and wherein each rib includes a channel of T shaped cross section for captively retaining a seal means or
5 other fitting of the rooflight.

A standardised frame member may be used throughout a rooflight with either seal means or other fittings such as trim or flashing being inserted into
10 the T shaped channel. Where hinged windows are included then the hinged edge is preferably accommodated in a frame member having a hinge formation.

Conveniently each rib of the frame member is profiled to include a snap engaging formation to facilitate connection with a capping member of the capping means having co-operating snap engaging formations. This is particularly useful where
15 co-planar panels are to be connected in the absence of any reinforcement such that the connection is completed simply by snap fitting a capping member on the inside or outside (or preferably both) of the
20 rooflight.

According to a further aspect of the present invention there is disclosed a capping member for use with such a frame member and having a snap engaging formation co-operable therewith.
25

Preferably such a capping member is adapted to overlay adjoining co-planar windows, which capping member comprises an extrusion of generally U shaped cross section and profiled so as to overlay both a
30 first and second frame member, and including a snap engaging formation which is snap engageable with the first frame member, each frame member having brush seals extending into sealing contact with the capping
35 member.

An alternative capping member is also disclosed comprising an extrusion of generally T-shaped cross section, having an overlay portion which overlays in use adjacent frame members of adjoining co-planar windows and a re-enforcing portion extending at right angles to the overlay portion and connectable to one of the frame members.

Conveniently, the re-enforcing portion is recessed to define a slot between the re-enforcing portion and the frame member to which it is connected, and catch means longitudinally slideable in the slot to facilitate connection at an end of the capping member to a structural element of the rooflight.

The rooflight may include a ridge assembly comprising a pair of support members for supporting respective windows, a linkage member linking the members in parallel spaced apart relationship, the members being relatively inclined to define a pitch angle of the rooflight, and wherein the linkage member is pivotally connected to each respective support member to facilitate adjustment of the pitch angle.

Preferably the linkage member comprises two generally cylindrical lugs extending parallel to the support members, each lug being captively located within a part cylindrical recess in a respective support member and pivotal therein.

The support members and linkage member may therefore comprise the connecting means operable between parallel adjacent frame members in a rooflight as hereinbefore disclosed.

Specific embodiments of the present invention will now be described by way of example only and with

reference to the accompanying drawings of which:

5 Figure 1 is a perspective view of a rooflight having a rectangular base and rising to a ridge,

 Figure 2 is a section through a hip formation of the rooflight of Figure 1 and sectioned at II-II to reveal double glazed window panels,

10 Figure 3 is a sectional view of the rooflight of Figure 1 taken at III-III,

 Figure 4 is a sectional view of the ridge portion of the rooflight of Figure 1 taken at IV-IV,

15 Figure 5 is a sectional view through the base frame of the rooflight of Figure 1 taken at V-V,

 Figure 6 is a sectional view of an alternative hip joint to that shown in Figure 2 and adapted for use with single glazed windows,

20 Figure 7 is a perspective view of an alternative rooflight having a square base and rising to a point,

 Figure 8 is a sectional elevation at VIII-VIII of the upper part of the rooflight of Figure 7,

 Figure 9 is a sectional view of an alternative ridge portion for use with the rooflight of Figure 1,

25 Figure 10 is a sectional view of an alternative stile formation to that shown in Figure 3 and including a support member of generally T-shaped cross section, and

30 Figure 11 is a perspective end view of the support member of Figure 9 and showing a connecting catch.

35 Figure 1 shows a rectangularly based rooflight 1 having glazed panels 2 which extend between a base frame 3 and a ridge 4. The base frame 3 is rectangular having longitudinal members 5 and

- 6 -

transverse members 6 which lie in a horizontal plane and are attached peripherally to an aperture 7 in a roof surface 8 of the building.

5 The ridge 4 extends parallel to and equi-spaced from the longitudinal members 5 at an elevated position above the roof surface 8 such that each of the glazed panels 2 slopes downwardly from the ridge 4 towards the base frame 3.

10 The rooflight 1 includes at each corner a hip formation 9 connecting an end 10 of the ridge with a corner 11 of the base frame 3. A number of stile formations 12 connect the ridge 4 and the longitudinal and transverse members 5 and 6 respectively so as to intersect at right angles therewith.

15 Figure 2 shows sectionally a hip formation 9 which connects edge portions 15 and 16 of glazed panels 2a and 2b respectively. The hip formation 9 comprises an outer capping member 17 which is of extruded aluminium and of generally arcuate cross section. The edge portions 15 and 16 are received in extruded frame members 18 and 19 respectively which are of generally U shaped cross section and are bonded and sealed to the edge portions 15 and 16 by the bonding layer 25.

20 The outer capping member 17 which is located on the outside of the rooflight overlays both of the frame members 18 and 19 and includes longitudinal edge portions 20 and 21 which project towards and at right angles to the glazed panels 2a and 2b respectively. The outer capping member 17 therefore conceals from external view the frame members 18 and 19.

30 An inner capping member 22 is located on the inside of the rooflight 1 so as to overlay the frame members 18 and 19 and includes longitudinal edge portions 23 and 24 which extends towards and at right

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angles to the glazed panels 2a and 2b such that the frame members 18 and 19 are concealed from internal view with respect to the rooflight 1.

5 A steel core 27 comprising a generally V shaped channel is connected by screw fasteners 28 to both the frame members 18 and 19 so as to maintain them in parallel co-extensive positions such that the glazed panels 2a and 2b are positioned with adjacent edge portions 15 and 16 in fixed parallel relationship with the glazed panels 2a and 2b lying in planes which are inclined to one another.

10 The outer capping member 17 has a central rib 26 which extends inwardly and includes a screw engageable channel 29 into which screws 30 are threadably received so as to pass through the inner capping member 22. The inner and outer capping members 22 and 17 are thereby maintained in fixed spaced apart relationship.

15 Each of the frame members 18 and 19 includes inner and outer brush seals 31 and 32 respectively which are received in channels 33 and 34 respectively of T shaped cross section and extend longitudinally of the frame members with brush filaments 35 extending away from and generally at right angles to the panels 2a and 2b. The inner and outer capping members 22 and 17 are maintained in contact with the brush filaments 35 of the inner and outer brush seals 31 and 32 respectively such that a continuous seal is formed along the length of both the edge portions 15 and 16 between the outer capping member 17, the outer brush seal 32, the frame member 19, the bonding layer 25, the glazed panel 2b and between the inner capping member 22, the inner brush seal 31, the frame member 19, the bonding layer 25 and the edge portion 16 of the glazed panel 2b. The edge portions 15 and 16 are

therefore sealed both internally and externally to the inner and outer capping members 22 and 17 respectively so that a continuous weather proof barrier is formed by the hip formation 9. Additional thermal insulation is provided by packing 37 which is located within the steel core 27.

Figure 3 shows sectionally a stile formation 12 which connects coplanar panels 40 and 41 having parallel and spaced apart edge portions 42 and 43. The edge portions 42 and 43 are received in extruded aluminium frame members 44 and 45 of generally U shaped cross section which fit around the edge portions 42 and 43 and are sealed thereto in each case of a bonding layer 57. Frame member 44 includes inner and outer brush seals 46 and 47 respectively received in channels 48 and 49 respectively of T shaped cross section, the seals having brush filaments 50 which extend at right angles to and away from the plane of the glazed panel 40.

An inner capping member 51 is attached to the frame member 44 by means of co-operating snap fit formations 52 and 53 of the frame member 44 and the inner capping member 51 respectively. The inner capping member 51 is formed from a resilient aluminium extrusion so as to be sufficiently deformable to be snap fit engageable with the snap fit formation 52.

The inner capping member 51 overlays the frame members 44 and 45 internally with respect to the rooflight 1 such that they are concealed from view. The frame member 45 similarly includes brush seals 54 and 55 which are disposed in like manner to those of the frame member 44. The filaments 50 of the inner brush seal 54 extend into sealing contact with the inner capping member 51 such that a continuous seal is

5 formed between the panel 41, the bonding layer 57, the frame member 45, the brush seal 54, the inner capping member 51, the brush seal 46, the frame member 44, the bonding layer 57 and the other glazed panel 40.

10 An outer capping member 56 is snap fitted to the frame member 45 and overlays the frame member 44, there being a like seal effected by brush seals 47 and 55 between the glazed panels 40 and 41. Because the inner and outer capping members 51 and 56 are attached to opposite frame members 44 and 45 respectively the capping members do not impede relative movement of the panels 40 and 41 in a direction at right angles to the plane of the panels in the sense that panel 41 may be raised i.e. moved towards the top of Figure 3 (as shown) with respect to panel 4 such that brush seals 50 and 54 no longer make contact with their co-operating capping members 56 and 51 respectively. It is therefore possible for the panel 41 to comprise an opening window as shown in Figure 1.

25 Figure 4 shows sectionally a ridge 4 in which double glazed panels 60 and 61 are hingedly connected at an inclined angle. The ridge 4 is supported by a horizontally extending ridge core 62 of galvanised steel plate having inclined sidewalls 63 and 64 defining the angle of pitch. Extruded hinge members 65a and 65b are fixedly connected to sidewalls 63 and 64 respectively and include spiral formations 66a and 66b which co-operate with interfitting spiral formations 67 of frame members 68a and 68b of the panel 60 and 61. The co-operating spiral formations 66 and 67 together comprise pinless hinges 69 allowing articulation of the panels 60 and 61 with respect to the ridge 4.

35 An outer capping member 70 overlays the frame

members 68a and 68b together with the ridge core 62
extending between them and is connected by a screw
fitting 71 to the ridge core 62.

An inner bracket 72 connects the hinge members
65a and 65b each which include cap portions 73a and
73b such that the cap portions 73a and 73b and the
inner bracket 72 together comprise an inner capping
means 74. Each of the frame members 68 includes an
inner brush seal 75 which is received in a channel 76
of T shaped cross section and has filaments 77
extending inwardly with respect to the rooflight 1 and
at right angles to the panels 60 and 61 respectively.
Each of the inner brush seals 75 makes sealing contact
with a co-operating flange 78 of the respective hinge
member 65. When a window is opened by articulation of
panel 60 for example about the pinless hinge 69a the
brush seal 75a is moved out of contact with the flange
78a but upon closing the window the seal is readily
remade as contact is resumed. In the arrangement
shown in Figure 4 the right hand window pane 61 is a
non opening window and includes a neoprane block 79
which is inserted between the frame member 68b and the
outer capping member 70 to provide additional
weatherproofing.

In the closed window position, a continuous seal
is formed between glazed panel 60, the frame member 68
to which it is sealably attached, the brush seal 75,
the flange 78 of the inner capping means 74 and in
like manner the seal is continued to the glazed panel
61.

Figure 5 shows the manner in which the rooflight
1 is attached to an upstanding part 80 of the roof
surface 8. A base frame 3 in the form of a continuous
pressing is secured to the upstanding part 80 so as to

surround the aperture 7.

5 The brackets 81 are arranged so as to support an
inclined surface 82 of the base frame 3 at the same
angle as and in contact with a glazed panel 83. A
flange 86 of the base frame 3 extends at right angles
to the inclined surface 82 in proximity with the base
frame member 84 of the panel 83. The base frame 3
10 also includes an outwardly turned flange 90 which
forms a flashing, the inclined surface 82, the flange
86 and the flange 90 together forming a profile of
generally S shape. A further flashing 91 is clamped
between the brackets 81 and the base frame 3 and
15 extends outwardly and downwardly thereof and is sealed
to an outer corner of the upstanding part 80 such that
a continuous seal is formed between the base frame 3
and the upstanding part 80.

20 Drain holes 200 are provided in the flange 86
adjacent to its connection with the inclined surface
82, the drain holes being provided at intervals around
the length of the base frame 3.

25 A brush seal 87 extends from the base frame
member 84 into sealing contact with the inclined
surface 82 so that a weatherproof seal is provided
along the length of the panel 83.

30 An elastomeric fin 88 is received as a sliding
fit in a channel 89 of the base frame member 84. The
fin 88 extends the full length of the base frame
member 84 and is of arcuate cross section so as to be
resiliently deformed in sealing contact with the
flange or flashing 90. The fin 88 is concealed from
view by an overlaying cap 92 which is received as a
snap fit upon the frame member 84. The right angle
35 corner 93 formed between the upstanding cap 92 and the
window panel 83 is infilled with a silicon weathershed

94 and drain holes are provided (not shown) to allow water running off the panel 83 and the weathershed 94 to pass through the cap and base frame member 84, the drain holes being spaced at intervals along the length of the base frame.

Figure 5 shows a non opening window which is prevented from opening by screw fittings 85 whereas an opening window would appear similar but with the screw fittings removed.

Figures 6, 7 and 8 show an alternative rooflight 100 having a square base 101 and triangular windows 102 which rise to an apex 103.

In Figure 6 a hip joint 104 of the rooflight 100 is sectionally shown. Single glazed panels 105 and 106 are received in frame members 107 and 108 respectively from each of which extends an inner brush seal 109 and an outer brush seal 110.

An outer capping member 111 overlays both frame members 107 and 108 and is sealably connected to the frame members by the respective outer brush seals 110. An inner capping member 112 overlays the frame member 107 and 108 on the inner side of the rooflight 100 and similarly is sealed to the frame members by the respective inner brush seals 109.

A screw fitting 113 connects the inner and outer capping members 112 and 111 so as to form a self supporting structure in which the frame members 107 and 108 are compressed between the inner and outer capping members 112 and 111.

The outer capping member 111 is an extrusion of generally arcuate cross section with edge flanges 114 extending generally at right angles to the glazed panels 105 and 106. A central rib 115 extends inwardly and includes a screw engageable channel 116

5 into which the screw fitting 113 is threadably engaged. A plurality of like screw fittings 113 are inserted along the length of the capping members 111 and 112 at suitable intervals.

10 The hip joint 104 is adaptable to accommodate glazed panels arranged at different pitch angles since the pitch angle may be adjusted by slackening the screw fitting 113 and tilting one or other panels as required before retightening the screw fitting.

Figure 8 shows the manner in which an apex cover 120 overlays the apices 121 of the windows 102.

15 The alternative ridge portion shown in Figure 9 for use with a rooflight of Figure 1 has an inner capping means 130 which differs from the inner capping means 74 shown in Figure 4 in that it is adapted to accommodate adjustment in the pitch of the rooflight. Instead of being connected by an inner bracket 72
20 defining a fixed pitch angle as seen in Figure 4 the ridge 131 of Figure 9 includes cap portions 132 and 133 which are relatively inclined to define a pitch angle. The cap portions include arcuate projections 134 and 135 defining channels 136 and 137 respectively
25 which extend longitudinally with respect to the ridge 131.

A linkage member 138 connects the cap portions 132 and 133 and extends longitudinally with respect to the ridge 131. The linkage member 138 is of inverted
30 U shaped cross section so as to define depending arms terminating in cylindrical lugs 139 and 140 which are conformally received within the channels 136 and 137 and captively retained by the arcuate projections 134 and 135 respectively. The cap portions 132 and 133
35 are pivotal about the lugs 139 and 140 respectively to a limited angular extent to thereby provide hinge

5 action between the cap portion 132 and 133 and consequently provide adjustment of the pitch angle of the rooflight. In an alternative embodiment (not shown) the link member may define a pair of generally cylindrical channels in which are captively located in cylindrical lugs projecting from the cap portions.

10 The cap members 132, 133 are each formed integrally with hinge members 65a, 65b respectively to constitute support members for supporting windows having panels 60, 61 respectively.

15 In Figure 10, an alternative stile formation 120 is shown which connects co-planar panels 40 and 41 having parallel and spaced apart edge portions 42 and 43 in similar manner to the stile formation 12 shown in Figure 3.

20 The stile formation 120, however, includes an inner capping member 121 which is of generally T-shaped cross section and comprises an overlay portion 122 which overlays both frame members 44 and 45 so as to conceal them from internal view with respect to the skylight and also comprises a reinforcing portion 123 extending at right angles to the overlay portion and attached via a screw fitting 25 124 to frame member 44.

 The reinforcing portion 123 is recessed to define a slot 146 between the reinforcing portion and the frame member 44.

30 Figure 11 shows an end view of the inner capping member 121, showing a catch 124 by means of which the inner capping member is connectable to either a base frame member or ridge of the rooflight. The catch 124 comprises a catch member 125 in the form of an elongate flat plate which is slidably received within 35 the slot 146. Longitudinal movement of the catch

5 member 125 is limited by a headed fastener 126 (such
as a rivet or screw) which is connected to the catch
member and extends through a slotted hole 127 in the
inner capping member 121, the catch member being
captively retained and slidable into or out of
engagement with a cooperating aperture 96 as shown in
10 Figure 5 where the aperture is formed in the flashing
90.

The inner capping member 121 thereby provides a
means of reinforcing a stile formation 120 and is
particularly useful where particularly long panels are
to be supported.

15 The inner capping member 121 is an extruded
aluminium section.

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CLAIMS:

1. A rooflight comprising a plurality of windows, each window comprising a glazed panel bounded by edge portions and each edge portion being received in and sealed to a respective frame member, wherein parallel adjacent first and second frame members of adjoining first and second co-planar windows respectively are overlaid by a capping member comprising an extrusion profiled so as to overlay both the first and second frame member, and including a snap engaging formation which is snap engageable with the first frame member, each frame member having seal means normally extending into sealing contact with the capping member, the arrangement being such that the capping member is attached only to the first frame member so as not to impede relative movement of the windows when at least one window is required to be openable.

2. A rooflight as claimed in claim 1 wherein the seal means of the first and second frame members comprise first and second brush seals respectively.

3. A rooflight as claimed in claim 1 or 2 wherein the first and second frame members each comprise an extruded profile including a U shaped channel for receiving an edge portion of a panel, a pair of opposed ribs extending at right angles to and on opposite sides of the panel and wherein each rib includes a channel captively retaining a seal means.

4. A rooflight as claimed in claim 3 wherein each rib is profiled to include a snap engaging formation co-operable with a snap engaging formation of a capping member.

18.

accompanying drawings.

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